Object-Oriented Programming I (CSE 121)
Week # 12
(Files in C++)

Objective(s)

In this lecture, you will learn:

1. What are Files?
2. How to create and write to a file
3. How to read from a file
4. Program Examples

Files: Files are used to store data in a storage device permanently.

>> The **fstream** library allows us to work with files. It includes the following three classes

- **ofstream**: Creates and writes to files
- **ifstream**: Reads from files
- **fstream**: A combination of ofstream and ifstream: creates, reads, and writes to files

>> How to create a file in C++.

- To create a file, use either the **ofstream** or **fstream** class, and specify the name of the file.

```
//How to create a file
#include<iostream>
#include<fstream>
using namespace std;

int main()
{
   //Create a text file
   ofstream file;
   file.open("one.txt");

   //Close the file
   file.close();
   return 0;
}
```

```
//How to create a file
#include<iostream>
#include<fstream>
using namespace std;

int main()
{
   //Create a text file
   ofstream file("one.txt");

   //Close the file
   file.close();
   return 0;
}
```

Why do we close the file?

It is considered good practice, and it can clean up unnecessary memory space.

>> How to create and write to a file in C++.

- To create a file, use either the **ofstream** or **fstream** class, and specify the name of the file.
- To write to the file, use the insertion operator (<<).

```
/** How to create & write to a file. To write to the file, use the insertion operator (<<). **/
#include<iostream>
#include<fstream>
using namespace std;

int main()
{
   //Create and open a text file
   ofstream file("one.txt");

   //Write to the file
   file << "Welcome Everyone.\n";

   //Close the file
   file.close();
   return 0;
}
```

>> How to read from a file in C++.

- To read from a file, use either the **ifstream** or **fstream** class, and the name of the file.
- Note that we also use a **while** loop together with the **getline**() function (which belongs to the **ifstream** class) to read the file line by line, and to print the content of the file:

```
//How to read from a file.
#include<iostream>
#include<fstream>
using namespace std;

int main()
{
  // Create a text string, which is used to output the text file
  string text;

  //Read from a text file
  ifstream file("one.txt");

  // Use a while loop together with the getline() function to read the file line by line
  while(getline(file,text)){
    // Output the text from the file
    cout << text << endl;
  }

  //Close the file
  file.close();
  return 0;
}
```

Example 1: How to create and write to a file. Inputs are taken from user.

```
#include<iostream>
#include<fstream>
using namespace std;

int main(){
  string name,ID;

  ofstream file("one.txt");

  cout << "Enter your name: ";
  getline(cin,name);
  file << name << "\t";

  cout << "Enter your ID: ";
  getline(cin,ID);
  file << ID << "\n";

  file.close();

  return 0;
}
```

Example 2: How to create and write multiple lines to a file.

```
//Multiple students' information are taken from user and write them to a file.
#include<iostream>
#include<fstream>
using namespace std;

int main(){
   string name, ID;
   float CGPA;

   ofstream file("one.txt",ios::app);

   for(int i = 1; i < 3; i++){
      cout << "Enter your name: ";
      getline(cin,name);
      file << name << "\t";

      cout << "Enter your ID: ";
      cin >> ID;
      file << ID << "\t";

      cout << "Enter your CGPA: ";
      cin >> CGPA;
      file << CGPA << "\n";
      cin.ignore();
   }
   file.close();
   return 0;
}
```

Example 3: How to read multiple lines from a file.

```
#include<iostream>
#include<fstream>
using namespace std;

int main()
{
   string line;
   ifstream file("one.txt");

   while(getline(file,line))
   {
      cout << line << endl;
   }
file.close();
return 0;
}
```